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JOURNAL

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OF THE

MASSACHUSETTS ASSOCIATION

OF

BOARDS OF HEALTH

An Official Quarterly Record of
Information for the Public

APRIL, 1900

Proceedings of the January Annual Meeting
Subject: Diphtheria from Infected Milk

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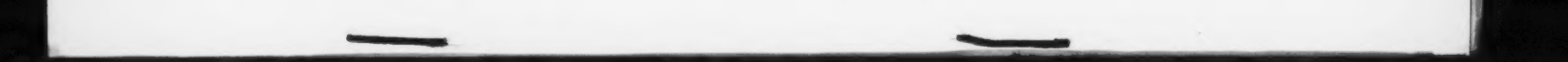

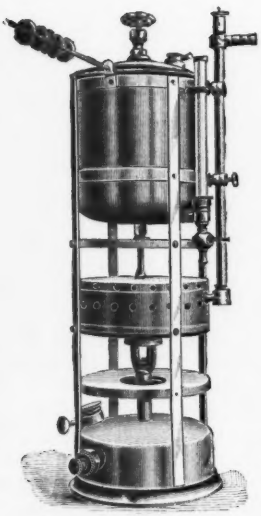

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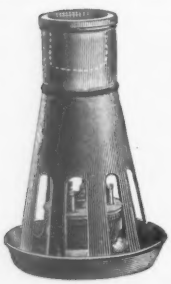

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Massachusetts State Board of Health Report, 1891.

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Organic and Volatile Matter,	.64
Mineral Solids,	2.57
Consisting of	
Silica,	.53
Iron Oxide and Alumina,	.02
Carbonate of Lime,	.75
Carbonate of Magnesia,	.23
Sodium Chloride,	.36
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JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

January Meeting, 1900

SUBJECT: A Diphtheria Outbreak believed to be due to Infected Milk

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THE JOURNAL OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston in March, 1890, with the following objects: the advancement of sanitary science in the Commonwealth of Massachusetts; the promotion of better organization and co-operation in the local Boards of Health; the uniform enforcement of sanitary laws and regulations; and the establishment of pleasant social relations among the members of the Association.

All persons holding appointments as members of a Board of Health in a Massachusetts city or town, the executive officers of such a local board, and the members of the State Board of Health are eligible to membership. Other persons may be elected members by vote of the Association. The annual dues are one dollar and fifty cents, and should be paid to the Treasurer, James B. Field, M.D., 329 Westford Street, Lowell, Mass.

The Association holds four regular meetings each year, the annual or January meeting always being held in Boston.

THE OFFICIAL JOURNAL OF THE ASSOCIATION is a quarterly publication, containing the papers read at the meetings, together with verbatim reports of the discussions following them. No part of this matter is printed in any other periodical.

The JOURNAL will present, from quarter to quarter, a fair and adequate picture of the progress of practical sanitary science as applied to the needs of a modern community. The various subjects which are reviewed in the quarterly meetings of the Association are treated by experts qualified to speak from daily experience in Public Health offices, who, as men of science, are careful to be scientific and comprehensive, and who, as public officers, are no less careful to speak pertinently and so as to be easily intelligible to the layman.

The JOURNAL, in a word, appeals to all whose interests touch the questions of sanitation and hygiene,— to the architect, the school-committee-man, the manufacturer, the contractor, and, above all, to the busy practitioner who has no time for any reading but what is brief and to the point.

The subscription price of the JOURNAL is one dollar a year, payable in advance. Single numbers, twenty-five cents. It is on sale at the Old Corner Bookstore, and at Smith & McCance's Bookstore, 57 Bromfield Street, Boston.

All communications to the Association should be addressed to the Secretary, **EDWIN FARNHAM, M.D., City Hall, Cambridge, Mass.**

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JOURNAL OF THE

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

ORGANIZED 1890.

[The Association as a body is not responsible for statements or opinions of any of its members.]

VOL. X. April, 1900. No. 1.

JANUARY MEETING

OF THE

Massachusetts Association of Boards of Health.

The annual meeting of the Massachusetts Association of Boards of Health was held at the Parker House, Boston, on the afternoon of Tuesday, Jan 30, 1900, the President, Henry P. Walcott, M.D., in the chair. After the dinner the proceedings were as follows: —

THE PRESIDENT.— Will the members of the Executive Committee come to this end of the room for the purpose of a meeting? I would also ask that any member of the Association having in his possession names of persons to be recommended for membership in the Association will kindly give them to his nearest neighbor who happens to be a member of the Executive Committee or send them to this end of the table. It is moved also that a committee of three be appointed to retire and bring in a list of names for the officers for the ensuing year. Is it your pleasure that that committee be appointed?

The motion was adopted.

THE PRESIDENT.— The chair will appoint as that committee Mr. Pilsbury, of Boston, Dr. Ripley, of Brockton, and Dr. Mason, of

Fitchburg. I have here a list of the retiring officers for the year for the benefit of the committee.

Dr. Durgin, Vice-President, in the chair.

THE CHAIRMAN.— The Association will now listen to the reading of the records by the Secretary.

Mr. James C. Coffey, Secretary *pro tem.*, read the records of the October meeting at Leominster.

THE CHAIRMAN.— Any corrections to be made in the records as read? If not, they will be allowed to stand. Awaiting the report of the Retiring Committee, we will suspend the election of officers, which is the next business on the card.

The Secretary will read the names of those who have been recommended for membership by the Executive Committee.

The Secretary read the following list of names: —

J. H. STICKNEY, M.D.	Boston.
HOWARD P. ROGERS, D.V.M.	Allston.
THOMAS K. CUMMINGS	Milton.
CHARLES P. MORRILL, M.D.	North Andover.
GEORGE W. BATCHELDER	Worcester.
L. M. PALMER, M.D.	South Framingham.
GEORGE BUCHANAN	Woburn.
VIVIAN DANIEL, M.D.	Watertown.
EBEN C. NORTON, M.D.	Norwood.
CHARLES B. FOWLER	Salem.
G. ARTHUR BODWELL	Salem.
WILLIAM O. SAFFORD	Salem.
GEORGE O. WHITING	Lexington.
GILMAN OSGOOD, M.D.	Rockland.

On motion of Mr. Coffey the above-named gentlemen were elected to membership.

THE CHAIRMAN.— The next business on the programme is the election of officers for the ensuing year. Is the committee ready to report? Pending the return of the absent committee, we will listen to the annual report of the Treasurer: —

ANNUAL REPORT OF THE TREASURER.

RECEIPTS.

Balance from 1898		$751.64
Received from interest	$21.70	
Received from annual dues	226.50	
Total receipts		248.20
Grand total		$999.84

EXPENSES.

Postage and revenue stamps	$28.84	
Printing	23.88	
Cigars and dinner for guests	21.50	
Clerical assistance	6.12	
Total expenses		$80.34
Balance to 1900		$919.50

Of this balance $709.16 is drawing interest.

Respectfully submitted,

JAMES B. FIELD, *Treasurer.*

Examined and approved as correctly cast and properly vouched for.

J. ARTHUR GAGE, *Auditor.*

I have here a summary of our financial standing for ten years. We started in ten years ago with $3 dues, which we kept up for six years, then one year at $2, and now three years at $1.50. The first year we had only 83 members paying assessments. It held somewhere between 83 and 88 for about five years. Then the Association started to grow; and in succeeding years the number paying was 112, 114, 137, 146, and last year 151 paid assessments,—83 in the beginning, 151 last year. Owing to the foresight and wisdom of our Publishing Committee, we have been enabled, during the last two years, to reduce our expenses materially. Although it might be possible for us now to get along with an annual due of $1 per member, yet for many reasons it seems wiser to recommend that the present rate of $1.50 be maintained for a few years longer.

On motion of Mr. Coffey the report of the Treasurer was accepted.

THE CHAIRMAN.— Is there any miscellaneous business to come before the meeting? Has the Nominating Committee yet returned? While waiting for the committee, I should like to say in behalf of the Committee on Prize Essays that it has been found impossible for the committee to report to-day, and the circumstances demand that the committee should have more time. Perhaps in the course of two weeks, maybe less, we shall be able to agree, and then publish in the *Medical Journal;* and the successful paper will be printed in the next *Quarterly Journal* of the Association. In behalf of the committee I would ask for two weeks' further time.

On motion of Dr. Marion the Association granted the committee further time.

Formal proceedings were suspended for a few minutes while waiting for the report of the Nominating Committee.

THE CHAIRMAN.—If the Association will come to order, we will proceed with the programme, and then suspend when the committee returns with the nominations. The next business is a paper on "A Diphtheria Outbreak believed to be due to Infected Milk," by Dr. H. Lincoln Chase, of Brookline.

A DIPHTHERIA OUTBREAK BELIEVED TO BE DUE TO INFECTED MILK.

BY H. LINCOLN CHASE, M.D.,

AGENT OF THE BOARD OF HEALTH, BROOKLINE, MASS.

The comparative infrequency of epidemics of diphtheria due to infected milk, and the importance of their early detection, seem to justify some record of such an outbreak that recently occurred in Brookline, Mass. During the summer there had been reported occasional cases of diphtheria in the town, the record by months being as follows: June, 3; July, 3; and August, 10. This amount of diphtheria in a residential town of 19,000 inhabitants, and located on the borders of a great city never entirely free from that disease, is scarcely worthy of special note; but the Board of Health, following its usual policy of isolating at least the first cases of any dangerous contagious disease appearing in the more densely populated districts, and especially those in tenement houses, opened its diphtheria hospital early in the summer, and promptly removed to it such patients as it seemed necessary should be isolated. The additional precaution was also taken, when the public schools reopened early in September, of making daily medical inspections of the pupils at the larger schools and those nearest the two districts that had furnished most of the cases of diphtheria during the summer. A little later this inspection was extended to all the public schools in town except a very small one in the extreme southern end; and the offer and recommendation to daily inspect the 200 pupils of the parochial school was also accepted, one case of diphtheria having appeared there. Investigation showed that the cases of diphtheria from each of the two districts mentioned had nothing else in common than the sharing of the same crowded space in and about their homes. Undoubtedly there were a number of light, undetected cases among them. Their milk supply was examined into, but threw no light on the question.

The total number of cases of diphtheria in Brookline reported in

September was 22, and the causes of the epidemic — if such it could be termed — seemed only those usually found under similar circumstances. On October 9 a girl of eight years, the child of a Brookline milkman, was reported by Dr. Blanchard to have diphtheria; and the diagnosis was confirmed bacteriologically. The writer visited the family, gave a full dose of antitoxin to the sick child and smaller doses to the mother, the little brother, and the sister of eleven years, and sent the patient to the hospital. Noticing at the same visit that the older sister appeared ill, and her throat showing exudate or membrane on the tonsil, a bacteriological culture was made, and next morning found positive, whereupon she followed her sister to the hospital, and the infected rooms were thoroughly fumigated with formaldehyde. Cultures from the father, mother, and brother were negative. Being apprehensive of infection of the milk, the inspector of milk, Dr. F. H. Osgood, was notified, and with the writer visited the premises, which were found to be unsatisfactory in regard to cleanliness. Although neither the milk nor the cans ever were taken into the house, the boiling water for scalding out the cans was brought from the kitchen. Satisfactory arrangements were at once made for boiling the water under a shed in which the cans were scalded out. The two milkers slept in the attic of the milkman's house, and also ate in his house, but not with his family, except that occasionally one of the children would eat with them. The men were directed to both board and lodge away from the house until further investigation could be made, and they did so. On questioning the two milkers as to sore throat, one admitted that the previous Sunday he had felt slightly ill, and that his throat had felt a little sore. A culture was made from each with negative results. A second culture from the throat said to have been sore was, however, made at the suggestion of the bacteriologist of the Board of Health, Dr. Francis P. Denny; and this culture also was found to be negative. The milkman was forbidden to take any part whatever in the handling or delivering of the milk until he should receive permission. As a large part of the milk from this dairy was delivered in Boston, the Boston Board of Health was notified. No cases of diphtheria having been traced to this dairy at this time, and every one on the place remaining well, the two milkers were allowed,

after a week, to return to the attic to sleep and to the kitchen to eat, and the milkman to assist in scalding cans as previously. All went well as far as is known until the end of the month; and it was hoped that without any publicity and consequent serious damage to the milkman's business all necessary steps had been taken, and that every source of infection was removed. Subsequent events, however, proved this not to be the case.

On October 30 a Country Club employee, a carpenter, became ill with diphtheria, and went to the Board of Health Hospital. He was followed on the 31st by a second employee, a jockey. On November 3 a third employee, a waiter, became ill with diphtheria, and entered the hospital. On the 6th still another employee, a girl of twenty-three, serving as ladies' maid, was found to have diphtheria, and went to the hospital, the diagnoses in all cases being confirmed bacteriologically. It was then found that among the customers of this milkman was this club, which, though it had a small herd of its own, took daily for its thirty or more employees milk from two sources, one can a day, eight and one-half quarts, being from the dairy in question. The milk used by the members of the club and their guests was wholly from the club's own herd. The physician who attends at the club, Dr. Blanchard, notified the writer, and assisted in making cultures from the superintendent and the remaining employees of the club, twenty-nine in number. Of these only one, that from the club's cowman, was found positive. One employee, however, failed to appear with the others, and was discovered next day in bed with a very sore throat, which was found both clinically and bacteriologically diphtheria. He went with the cowman to join their four friends in the hospital. Formaldehyde disinfection by the Board of Health was thoroughly done in the infected rooms, and other precautions were taken; and, though other cases were looked for, none have as yet been discovered among either employees, members, or guests. About this time — namely, in the first week of November — Dr. Sabine found a case of diphtheria on Walnut Street in a servant-girl; and within a day or two after the two daughters of the family and the mother came down with the same symptoms, also a child on Tappan Street, a patient of Dr. Sabine. The diagnoses in all these patients, as in those from the Country

Club, were confirmed bacteriologically. On inquiry at their houses by the writer as to the milk supply, he found it came from the same unhappy dairy that the Country Club employees had patronized. November 10, four days after, the delivery of this milk was stopped in Brookline. A twelfth case occurred in this same milk route, and was reported by Dr. George H. Francis. The patient was a boy of eight years, living on Roberts Street, a nephew of the milkman. He went to the hospital dangerously ill, but finally recovered, as did all the other patients in the milkman's Brookline route.

Now we must go back a few days. Before the investigation at the Country Club was completed, the dairy was visited again by the writer, and some interesting information gathered. The two little girls were away at the hospital. The milkman, his wife, and little boy all appeared to be well, as did also his new milkers. One of the latter, however, was a new hand. Inquiring when and why the old hand had left, it transpired that, while he was boarding and lodging away from the house, he became alarmed about himself and very restless. Finally, he left without telling why or where he was going. Although the milkman and his two milkers seemed now perfectly well, and their throats appeared normal, it seemed best in view of all the circumstances to make tests of the throat of all three men, which was done. The culture from the milkman was negative; but those from both milkers were positive, showing the Klebs-Loeffler bacillus present in very large numbers. The men went to the hospital, the delivery of milk in Brookline from the dairy was entirely stopped, as previously stated, and the Board of Health of Boston, where most of the milk was sold, was again conferred with, and was informed of all the later facts in the case. To settle any doubt as to the virulence of the bacilli in the two milkers' throats, Dr. Denny inoculated two guinea pigs of about five hundred germs each from these cultures, with the result that both pigs died in less than thirty-six hours. Although the writer made no effort to discover how many cases developed among Boston families, some ninety of which were said to be in the Boston route, six Boston cases in three families, one case terminating fatally, came to his knowledge in the same period that the twelve Brookline cases were being reported. It should be stated in this connection that in the case of each of the

twelve Brookline patients no other source of infection, such as exposure in school to similar cases, was found, though looked for; also, that all twelve patients had regularly used milk or cream or both from the dairy in question. It should further be stated that the very few other cases of diphtheria reported during this period were nearly all accounted for by exposure other than by milk; also, that in no other milk route than this one were there more than one or two cases of diphtheria; while, of the seven or eight families in Brookline taking this milk, four of them had one or more of the members ill with diphtheria.

On November 25 the writer again visited the farm, hoping to be able to recommend to the Board of Health that the milkman should be allowed to resume business in Brookline. This time he found the milking was done mainly by the milkman alone, he having dispensed with about half his herd at the time his two milkers went to the hospital. He was occasionally assisted, however, by his brother, who previously had done nothing about his milk business, but had worked in other departments of the farm. The writer tested the throats of both men with the result that the milkman's throat was found, as previously, free from germs; but there were found a few Klebs-Loeffler bacilli in the culture from the brother. The permission for the delivery of the milk in Brookline was therefore postponed. December 12 Dr. Denny reported the second successive negative culture from the throat of the milkman's brother.

Reviewing the whole affair, several questions suggest themselves, among them these. At the time the milkman's two little girls went to the hospital, did the milker who owned up to a sore throat, but who failed twice to show a positive culture, actually have diphtheria? This would seem to be possible, but rather improbable. Did the milker who left shortly after the children were sent to the hospital have diphtheria in the incubation stage at the time his throat was tested with a negative result, and later, recognizing the usual symptoms, leave because fearful of being sent to the hospital or of giving the disease to his room-mate with a throat recently inflamed and susceptible? This explanation seems not only possible, but rather probable. Assuming the latter supposition to be correct, and that the man then gave diphtheria to his room-mate, the other milker, before

he took his sudden leave, it is very easy to account for the infection of the new hand and of the milk by both men. When we remember that milk is one of the best culture media known for the rapid multiplication of the bacilli of diphtheria, also that Pfluegger's investigations prove that persons with bacilli in their throats spray the air freely with these bacilli while talking even in an ordinary voice, it is easy to realize how great a source of danger to other people an undetected case of diphtheria, however light, is apt to be if its possessor is working daily over milk. The early detection of every such case is, therefore, a matter of great importance.

THE CHAIRMAN.— Dr. Chase's very interesting paper is now before the Association for discussion. Perhaps, inasmuch as this paper differs slightly from the succeeding paper, it would be better to discuss it now, before the other paper is read. I regret to say, on account of the allusion to cases in Boston, that two of the three physicians who had in charge the looking up of these cases are unavoidably absent this afternoon. Dr. Chapin, of Springfield.

DR. CHAPIN (Springfield).— I did not understand how many cases existed in Brookline at the time that were not due to the milk.

DR. CHASE.— Very few during the period in which these were reported. There were some eight or nine in the diphtheria hospital, and perhaps the same number in the town. Almost all, however, were corralled right there in the diphtheria hospital, as they occurred in the tenement districts.

THE CHAIRMAN.— Are there no other questions to be asked or observations to be made upon this paper?

DR. BURR.— Mr. Chairman, Dr. Chase has alluded to the Board of Health of Boston in this case. Perhaps it might be well to say a few words in regard to the Boston Board of Health's position. I think, perhaps, from Dr. Chase's remarks, that this Association might think that the Board of Health of Boston was notified twice. I don't know whether that is the fact or not, Dr. Chase; but, as I remember, the Board of Health of Boston received notice only on November 8, which was a month after the original cases occurred upon the farm. It might also be wondered by this Association why the Board of Health of Boston did not shut off that milkman's supply. It appeared

to us that, as long as the Board of Health of Brookline had removed the entire source,— that is, the two milkers at that time, November 8, — the possible source of infection or possible further infection of even the Boston customers had been removed. With that in view the milkman was called to the Board of Health of Boston, cultures were there taken, and he was instructed to have his cans and vessels used in milking and also in the delivery of milk thoroughly sterilized, washing in the usual way, and in addition to that disinfecting with formaldehyde, with which the Board of Health furnished him. It occurred to us that everything had been done that was possible to stop the further spread of diphtheria in Boston. It is rather interesting to note the very few cases which occurred in Boston when you consider the very large number of persons receiving that milk. There were some fifty or more families receiving milk from this particular milkman. Considering that the average number in each family is about five, then probably about two hundred and fifty people were receiving that milk, of whom only seven have shown any symptoms whatever.

DR. CHASE.— Mr. Chairman, in regard to allowing the milkman's business to go on, we did as Boston did, at the beginning. We reported, through Dr. Osgood, to the Boston Board when the trouble first began. We thought it was our duty to do it, knowing so much milk was sold in Boston. Then, in view of the precautions we took, the removal of those two children and isolating the men temporarily, we concluded it was best to let the business go right on; and we did so. Then later, in view of the later developments, we communicated again with the board, and were very willing to have those additional precautions followed out that Dr. Burr suggested. We did not stop the milk at the beginning. There had not been a single case reported on the route. Boston coincided in that view, and did not interfere with the business, either. After a month or more we thought it was our duty to stop it, and be sure. In view of the precautions taken the Boston authorities thought, on the whole, they could let it go on; and we don't know that there were any cases developed in Boston after the second notification. We thought, in view of the fact that we had perhaps erred a little the first time, that we certainly would not be caught that way a second time. But I think no new cases

occurred in Boston or Brookline later than four days from the time we stopped the delivery in Brookline.

THE CHAIRMAN.— It seems to me, gentlemen, that this offers a most interesting topic for every board in the State, and what occurred in Brookline is likely to occur in any other place within the Commonwealth. It seems to me that it is very creditable to Brookline that she should have so promptly and effectually investigated this case. If milk is, as I believe it may be, the medium through which diphtheria can be so easily communicated,— if that be the case, it becomes an interesting question for all of us. I thought the paper of Dr. Chase was one very worthy to come before the Association, and for every board of health in the State to know what can be and what ought to be done under like circumstances. I saw a moderate epidemic, in which perhaps eleven or twelve cases of diphtheria occurred in a remote part of Boston, some sixteen or eighteen, possibly twenty, years ago. We had not the laboratory at that time to aid us; but, so far as the investigation in a rough way would lead me, I concluded that the milk was the medium through which these cases had been communicated. I hope others of the Association feel the interest that I do in this milk question, and that there will still be more remarks concerning this interesting case.

DR. CHASE.— Mr. President, since reading my paper Mr. Stone has handed me this notice, stating that one of the Country Club employees, whom I never heard of, died at the Newton hospital of diphtheria. That would make the seventh case from the Country Club employees.

GEORGE WHITING.— I should like to inquire if Dr. Chase knows whether or not the same handler or handlers of the Brookline milk looked after the Boston supply as well, whether the milk was all mixed or kept apart.

DR. CHASE.— At the dairy they were the same.

MR. KEITH.— I should like to ask Dr. Chase if he considers that the testing of the throats of milkers would be a sufficient preventive measure for the protection of a milk supply, whether or not it would not be better, in other words, to shut off the milkman entirely rather than to allow the milk to be sold, as in this case, when the milk was drawn by parties not showing the Klebs-Loeffler bacilli in their throats.

DR. CHASE.— I think certainly the throat of everybody connected with it ought to be examined. We went through the whole family as well as the milkers. But, having found those men negative, we were sorry, in the light of subsequent events, that we did not shut it off at the outset. It seemed as if we had taken adequate precautions; and it is no light thing to shut off a man's business, unless you have more evidence than we had at that time. It would be wholly unprecedented, I am told by milk inspectors, if we had taken such action. It seems as if ordinary precautions had been used at that time. Any one can look back, of course.

DR. GAGE.— I should like to ask Dr. Chase whether if the milkman, when face to face with this problem, had said, "I will pasteurize my milk," he would have permitted him to have sold it or not, particularly as some milkmen deliver pasteurized milk.

DR. CHASE.— The milkman in this case was a very upright, honorable man. I have nothing but praise to say of his character. I think, if he had given his word of honor that he would pasteurize it, that I, personally, would have believed him; but I think that is rather an impractical question. I don't think any board of health would do that, and let the business go on in that way. I never heard of its being done when there was a question of contagion right on the farm. We did not think it was worth while to do that. His clients would not have taken his milk, I think.

DR. HILL.— I should like to ask Dr. Chase if he has formulated in his own mind any theory of the exact way in which infection was transmitted, whether he thinks it came from the children originally to the milkmen, or through this nephew who came in finally, or what the direct course of the disease from one to another until it finally got to the milk really was. You may have stated this, doctor, in your paper; but I did not catch it exactly.

DR. CHASE.— I think that in some way some one of these milkers got it from the children,— it seemed so to me; then that the milkers in talking while milking and spitting about, as they do, and in salivating their hands, as milkers do at the beginning of milking, in some way introduced the germs into the milk a portion of the time.

DR. HILL.— Your idea is, then, that the bacilli had been in the

throats of the helpers from the time the children were removed to the hospital in October — the 9th or 10th — until the end of the month, in spite of the negative cultures?

DR. CHASE.— It is a question in my mind. I can't say that I can answer that outright. But it seems as if, possibly, while the incubation stage was going on, those two successive negatives were not sufficient evidence of absence of disease from the milker's throat. It might have been overlooked that way. It seems as if it must have come some way from one of those two little girls to some one of those milkers, but I cannot piece it all out to my entire satisfaction.

DR. SWARTS.— Mr. Chairman, I think it would be interesting to know more about these seven cases which occurred in Boston, whether they came within a certain period, whether they might be connected with one can of milk or mess of milk, or whether the whole milking was the cause of those seven cases, or whether it was distributed through a number of different cans by the mixture. It is evident at the Country Club that the milk delivered there must have carried with it a considerable quantity of the infectious material from the farm; and, if there was no mixture there, it could be easily explained. As I understand, there was no mixture of the milk which went to the Country Club. If there was an individual can, of course it could be more readily understood. There is one thing, too, which I think might be considered in this connection; and that is the fact that a positive culture from the throat might have been followed, perhaps, by an examination of the nasal secretion, and a culture made there, as well as from the throat, as it is being found now in the various laboratories that examination of the nose will give a large percentage of positives, perhaps 50 per cent., and over, when it is also found in the throat, and it is frequently found in the nose when not in the throat. So, in such a case as that, where disease is present and liable to produce a disastrous result, it seems that examination of nose as well as throat for the whole members of the family would be desirable.

DR. CHASE.— In each examination I made, I made cultures from the nose as well as from the throat, making a man blow his nose upon a clean piece of cloth, then swabbing it from the piece of cloth. The milk that went to the Country Club was in an $8\frac{1}{2}$-quart can.

DR. SWARTS.— A can by itself direct from the farm?

DR. CHASE.— Yes.

DR. SWARTS.— That was not true of the Boston cases?

DR. CHASE.— What went to Boston? I don't know about that. That went, I think, straight in his wagons to Boston. As soon as we began to supervise his work, he began to dispose of his cows. He put four or five of them in charge of another man in Brookline; and then he sold about half his herd, and cut it down in those two ways to quite a small number.

DR. MILLER.— Mr. Chairman, I should like to ask Dr. Chase if, in the cases where he examined the secretions from the nose and throat, he always found them the same,— if it was negative in one, it was in both; and, if it was positive in one, it was in both? This gentleman just made the remark that sometimes disease was found in the nasal secretions when it was not in the throat.

DR. CHASE.— In this case I put the mucus from the nose and the throat both into the same test-tube, putting that from the throat in the lower part, and reserving the upper half for the nasal. As a matter of fact, in my examinations I have often found the bacilli linger longer in the nose than in the throat.

DR. MARION.— I should like to ask Dr. Chase if the herd itself was in healthy condition,— all the cows.

DR. CHASE.— Well, Dr. Osgood says none of them looked sick. There were a number of rather old cows which the man was willing to sell for beef at that time. They did not look sickly at all.

DR. HILL.— It is rather hard to follow a paper read in that way so as to get the exact relation of each date. Have you definitely ruled out the possibility that the cases at the Country Club might have infected the milk-cans, the latter being then taken back to the original milkman and so infecting his supply? That suggestion has come up, and I should like to know what you have to say about it.

DR. CHASE.— I don't think that could have been. These men all came down at about the same time. All came down within about a week of each other, I think.

DR. HILL.— But didn't the Country Club cases develop before the cases developed on the man's milk route?

DR. CHASE.— That club is a part of his route, you know. That is one of his large customers.

DR. HILL.— Doesn't that leave the possibility that the case at the Country Club — the original one, say, at the Country Club — developed from some other source, and then the can was infected and went back to the milkman, and then infected his route, so that others got it from him?

DR. CHASE.— The contingency seems very remote.

DR. HILL.— It has been suggested, and I simply wanted to know what you thought.

DR. CHASE.— I don't think people very often take any milk from a can and have it at table or round where these people could infect it, and then put it back into the can. I think they take a can and scald it out, or at least put it out. They don't keep the can round.

DR. HILL.— But where were those who were handling the can? Didn't you get positive cultures in one of those men?

DR. CHASE.— No, the throat of the man that had the washing of the cans was negative every time,— that is, the proprietor; and these men at the Country Club, just as soon as they were found to have diphtheria, went at once to the hospital. They did not stay long at the club with sore throats. There was no place to keep them there. The club was very particular to get them removed at once. Even walking cases they sent right to the hospital.

DR. BURR.— Mr. Chairman, I should like to ask Dr. Chase if he considered whether the help upon the milk farm and the Country Club as being connected in any way; that is, was there any communication between the help at the farm and the help at the club, which might account for these cases in some other way than through the milk supply of the farm. It seemed to me that the cases all came down pretty much at the same time; and, as I remember, a number of the Country Club cases among the help came down before the help upon the farm did. If I remember, the milker at the Country Club went to the hospital about the same time — and I think he was one of the later cases at the club — that the milkers from the milk farm did. I wondered if there was any communication between the help at both places.

DR. CHASE.— Yes, the milker there did go over about the same time as these others.

DR. HILL.— Mr. Chairman and gentlemen, in this connection perhaps a very short review of the main cases on record might be of some interest, because Dr. Chase's epidemic is the first that I have been able to find any record of in which those directly associated with the milk,— in the handling of it,— the milkman and helpers, etc., showed positive cultures. There are 13 epidemics that I have been able to find since 1879 to date, spreading over, then, about twenty years,— 13 epidemics, that is to say, in which the milk was considered the source of infection. This included altogether 634 cases of diphtheria. The source of infection was not detected at all in 7, although efforts were made in that direction. In 2 there was clinical diphtheria in the family of those who supplied the milk. The milk dealer himself had clinical diphtheria in 2 cases. In 1 case the milk dealer had sore throat, which was not demonstrated to be diphtheria, although examinations were made some little time after he had recovered, about a week or so, and bacilli were not found. In 1 it was supposed that the discharges of a diphtheria patient had been thrown on to the bedding of the cows, so that the udders might have become infected in that way, and the milk infected while the milking process was going on. The cows in 4 cases were found healthy. In 3 cases they showed lesions on the udders, commonly known as chapped teats. In 5 cases the cows were not mentioned. In 1 they were healthy at the time, but developed chapped teats afterward. The main point about all this is that, as the milk question appears to stand now, Dr. Chase's epidemic is the only one in which bacilli have been found in the throats of those associated with the milk, so that, although these 634 cases of diphtheria, spreading over these 13 epidemics, have been traced to milk, it has been entirely by circumstantial evidence. Circumstantial evidence, however, carries considerable weight in the case of typhoid epidemics, in which the typhoid organism is practically never found bacteriologically; and circumstantial evidence ought to weigh in these epidemics as well as in Dr. Chase's. I think it seems established that milk epidemics of diphtheria may exist, even although the proof, as I think in Dr. Chase's own case, is not absolute,— that is, I mean the absolute bacteriological evidence. The circumstantial evidence certainly

points strongly in that direction, but it would seem as if no one of these milk epidemics had been absolutely proved other than by circumstantial evidence.

THE CHAIRMAN.— Any further remarks to be made upon Dr. Chase's paper?

DR. DENNY.— Unfortunately, as Dr. Hill has said, we have no absolute proof that the infection took place through the milk. For that it would have been necessary to demonstrate the bacilli in the milk; but, unfortunately, we did not obtain a specimen which had been milked by the men who had the bacilli in their throats. The only other explanation for these cases could be that it was a coincidence; but it would certainly seem to be a very remarkable coincidence that there should have been twelve cases in Brookline among eight customers, and at the same time two milkers with almost pure cultures of virulent bacilli in their throats. One cannot help thinking that there was some connection between the milkers and those cases which developed.

DR. WINCHESTER.— Mr. Chairman, I should like to say, speaking of the cows, that I was able a few years ago, through the assistance of Dr. Ernst, to demonstrate what resemble very closely, if they are not identical with Klebs-Loeffler bacillus, the existence of the bacilli of diphtheria in cattle's throats; and Dr. Chase has the report.

THE CHAIRMAN.— Any further remarks? Has the Committee on Nominations returned?

MR. PILSBURY.— The Committee on Nominations submit the following list: —

President.

H. P. WALCOTT, M.D., of Cambridge.

Vice-Presidents.

S. H. DURGIN, M.D., of Boston. SAMUEL W. ABBOTT, M.D., of Wakefield.

Secretary.

JAMES C. COFFEY, of Worcester.

Treasurer.

JAMES B. FIELD, M.D., of Lowell.

Executive Committee (for two years).

G. L. TOBEY, M.D., of Clinton. W. Y. FOX, M.D., of Taunton.
W. H. GOVE, of Salem. CHARLES A. HICKS, M.D., of Fall River.
GEORGE H. ELLIS, of Newton.

THE CHAIRMAN.— Gentlemen, you have heard the report of your Nominating Committee. What is your pleasure?

DR. SWARTS.— I move that the report be accepted.

MR. PILSBURY.— I move that one vote be cast representing the sentiments of the meeting, there being but one nominee for each office.

THE CHAIRMAN.— It is moved and seconded that the Secretary of the Association be authorized to cast the ballot of the Association for this list of officers for the ensuing year.

The motion was adopted.

MR. COFFEY.— Mr. President, I cast this ballot for the Association.

THE CHAIRMAN.— In behalf of the officers just elected, the best of whom are absent, and all being modest men, I wish to return the thanks of the officers to the Association for this compliment.

MR. COFFEY.— Mr. President, as my election as Secretary, for which I am thankful, has been accomplished, it will necessitate the resigning of my position as a member of the Executive Committee, with one year to serve; and I accordingly resign as a member of the Executive Committee, in order that it may be filled at this meeting.

DR. MARION.— I move that the resignation be accepted.

The motion was adopted.

DR. MASON.— Mr. Chairman, I nominate Dr. D. S. Woodworth, of Fitchburg, to take Mr. Coffey's place.

THE CHAIRMAN.— It is moved and seconded that Dr. Woodworth, of Fitchburg, be made a member of the Executive Committee to fill the vacancy caused by the resignation of Mr. Coffey.

The motion was adopted.

THE CHAIRMAN.— The next in order on the programme is a paper on "Bacteriological Investigation of Milk," by Simeon C. Keith, Jr., B.S., of Charlestown.

ADDRESS OF MR. KEITH.

Milk as drawn from the healthy cow is practically free from bacteria; yet, unfortunately, it is not destined to remain so. The sources of the bacteria in normal milk are more numerous than one would naturally suppose at first. The so-called fore milk seems to always contain the germs of souring, and should be rejected if it is desirable to obtain a milk as nearly free from bacteria as is possible. However, more serious and greater sources of bacteria in milk arise from the introduction of hay dust, hairs, and loose cow-dung. With regard to this latter it is commonly thought that excreta can be removed from milk by straining it through cloth. But, as a matter of fact, this is not the case; for about one-half of cow-dung dissolves in the milk directly, and at the same time millions of fœcal bacteria find their way into it, and grow there, producing very unpleasant odors and tastes.

It has long been known that milk, as it is secreted in the cow's udder, is practically, if not entirely, sterile. Some ten years ago Professor Sedgwick and Mr. Batchelder succeeded in drawing milk free from bacteria by the use of sterilized milking-tubes. Last spring I tried a similar experiment in a somewhat different manner. I had an apron made so as to cover the entire sides and flanks of the cow, only allowing the teats to protrude. By this means all hair, dust, etc., was prevented from falling into the milk as it was drawn. The hands and teats were carefully washed with corrosive sublimate solution, and then about a dozen test-tubes that had previously been sterilized were successively filled from the same teat. Portions of these samples were at once used for making gelatine plate cultures, and the remaining milk was placed in an incubator at 98° Fahrenheit. These tubes were examined daily, and any change in the milk noted.

Tube I., containing the fore milk, coagulated at the end of two days; and the corresponding plate culture showed it to contain 1,160 bacteria per cc.*

Tube II. remained sweet four days, and showed 180 bacteria per cc.

Tube III. Sample taken after a pint had been drawn remained sweet six days, and showed 20 bacteria per cc.

Tube IV., etc. Several successive tubes taken by sterilized milking-tube remained good for seven days, but showed no colonies or plates. Probably a few bacteria were present, but so few that they escaped detection.

It will thus be seen that, even without milking-tubes, it is possible to draw practically bacteria-free milk, if the dust, hair, etc., is kept out.

At the same time that the above milk samples were taken, I exposed a gelatine plate in the stable for two minutes, and found by the colonies developing on it that during that time several thousand bacteria had been deposited there with the settling dust of the stable.

On the average, milk sold in cities contains from seven to ten million bacteria per cubic centimetre, and we all know that the keeping quality and healthfulness of such milk is not all that it should be; for, although, when kept cold, no apparent change takes place, yet, as Professor Sedgwick and Mr. Marshall have shown, there is a slow yet constant increase of bacteria that ultimately give rise to putrefaction, even though no souring change occurs. If the same milk, on the other hand, had been allowed to remain warm, even for a short time, the lactic acid bacteria would develop, and the milk would sour. So, although bacteria may be retarded in their growth by icing, yet, iced or not, either putrefactive bacteria or lactic acid bacteria are bound to develop.

Many of the aërator advertisements claim that aëration of milk will remove bacteria from it, and so prevent souring. But the real benefit derived from aëration comes from the fact that the milk, being charged with air, favors the growth of other than the souring bacteria, which thrive best when growing without air.

* About ¼ of a teaspoonful.

So that, while aëration, undoubtedly, prevents souring to a great extent, yet, on the other hand, it favors the growth of, perhaps, the less desirable putrefactive bacteria, and at the same time is likely to introduce large numbers of bacteria from the air as it comes in contact with the milk, especially if aërated in a stable or tie-up, where the average farmer is apt to do it.

With Messrs. H. P. Hood & Sons I have been enabled to visit a few dairies during the past year, and to attempt to trace the cause of the many high numbers of bacteria we found in the milk from them as received in Boston. With the dairies in question the following was the method of procedure. We first made bacterial analyses each week, until we knew what to expect from any given dairy that we were investigating. With this knowledge gained I visited the dairies, and sought to find out the cause of excessively high or low number of bacteria I had found, and in nearly every case was able to explain the reason for this.

Table 1 gives a general idea of the bacterial content in the milk found in ten dairies examined. The different numbers given show the number of bacteria per cc. in the milk, and in every instance examinations of the milk took place several successive days. It will be seen that dairies Nos. 1–7 and 12 showed very large numbers of bacteria; and a visit to the farm in each of these instances showed unsanitary conditions, and that the milk had received poor care.

Dairy No. 3 was interesting, not on account of the high numbers found, but for the fact that in each of the three examinations numerous bacteria were found in the milk, which gave evidence of its having been too near the pump. An examination of the well water on this farm proved the correctness of our supposition from the fact that it showed a pure culture of the bacteria we had found in the milk. The farmer was warned about rinsing his cans in this water, and seemed surprised that we were able to tell him his milk had been watered; and even more so, when we were able to tell him where the water in question was taken from.

Dairies Nos. 2, 4, 6, and 8, while showing comparatively large numbers as would appear to some, yet may be considered as model dairies in every respect; and from a bacterial point of view the milk was not seriously contaminated.

TABLE No. 1.

Dairy No. 1.	**Dairy No. 6.**
7,300,000 numerous liquefiers	15,000
225,000	35,000
16,330,000	900,000
10,000,000	240,000
24,500,000	30,000
Dairy No. 2.	**Dairy No. 7.**
10,000 mostly B lactis	15,750,000
970,000	3,720,000
30,000	4,000,000
10,000	23,800,000
10,000	9,500,000
1,000,000	18,200,000
10,000	**Dairy No. 8.**
Dairy No. 3.	330,000
3,410,000 green liquefiers	330,000
4,550,000	60,000
3,600,000	20,000
Dairy No. 4.	1,730,000
15,000	90,000
300,000	**Dairy No. 9.**
970,000	12,440,000
40,000	9,560,000
65,000	21,700,000
Dairy No. 5.	3,600,000
135,000	6,860,000
10,000	15,000,000
60,000	**Dairy No. 10.**
100,000	20,000
50,000	135,000
100,000	1,070,000
600,000	400,000
20,000	30,000
250,000	50,000
	120,000
	1,100,000

It will also be seen, by referring to this table, that, on the whole, a bacterial analysis of a dairy reveals its character, and that two of

the same dairy on different days is an almost perfect indicator of what to expect of its condition.

In order to see what variation we should find in a number of cans of milk from the same dairy, in order to see what value could be given to our analysis, I analyzed nine cans of the same day's milk, with the following result, which seems to indicate, as did the analysis of milk of different days, that a very fair idea is to be had on our analysis. See Table No. 2.

TABLE No. 2.

55,000	220,000
420,000	50,000
750,000	100,000
270,000	725,000
700,000	

I have found, similar to Sedgwick and Marshall, that bacteria and acidity of milk have no fixed ratio. In other words, milk often shows high numbers of bacteria without of necessity showing acidity. On the other hand, however, as would be expected, I have never found acidity without large numbers of bacteria.

By means of peculiar flavors produced in milk by most lactic acid bacteria, expert tasters of milk are able to detect it before the acid is developed to any considerable extent. In other words, the taste of acidity is preceded by a peculiar flavor, which enables expert tasters to detect such milk before it is revealed by titration with standard alkali solutions. The minimum number of bacteria in milk of this character is about 20,000,000 per cc.

In many cases also I find that that milk thrown out by tasters does not contain high numbers of bacteria. This arises from the fact that often the cow eats something that renders the milk of bad flavor, or the milk has been allowed to stand in some place where it has absorbed foul odors, to which latter, milk has a great affinity.

I have since determined the numbers of bacteria in milk from several hundred dairies, and find, on the whole, that the bacteria present is rather lower than could be expected in view of the numbers present in most of the city milk.

In one lot of 67 dairies examined during the summer, 12 per

cent. showed less than 100,000 bacteria per cc., 50 per cent. 100,000 to 1,000,000 per cc., 25 per cent. 1,000,000 to 5,000,000 per cc., and 13 per cent. 5,000,000 and over per cc.

As I have said, however, there is some milk passed by the tasters that contains large numbers of bacteria; and it is my opinion, if dairy men did not of necessity have to mix their milk from different dairies to even up the amount of butter fat present, they would be much better off as regards the keeping quality and healthfulness of the milk, since a single can of poor milk will spoil a dozen cans of the best when mixed with them. Another source of the bacteria in city milk is the can in which it is delivered. Most milk-cans are washed with hot suds and rinsed in water. I have examined some 50 milk-cans to determine to what extent they may infect the milk, and find on the average there is a sufficient number remaining in a washed can to seriously affect the keeping quality of milk placed in it. The method of examining cans was to place 100 cc. sterilized water in a can, shake it up thoroughly, and empty back into the bottle. In this way, a part of the bacteria were removed with the water, and their numbers could be estimated by the usual process of plating.

Table 3 shows the numbers of bacteria found in 16 cans per cc. of water for rinsing.

TABLE No. 3.*

68,000	800,000
560,000	568,000
13,000	406,000
728,000	301,000
798,000	377,000
2,240,000	665,000
110,000	26,000
180,000	332,000

This means that if a quart milk-can, like the above, were filled with sterilized milk, the milk would have at once from 2,600 to 224,000 bacteria added, which number alone would be large enough to cause it to change if the milk received improper care afterward, as is often the case.

* A large proportion of the bacteria found were of the lactic-acid-producing types.

SUMMARY.

1. Milk in its natural state is free from bacteria, and, consequently, will keep indefinitely.

2. Fore milk contains a few bacteria, and should be rejected.

3. Milk is seeded with bacteria from dust, contact with improperly cleaned utensils, water, etc.

4. Bacterial analyses of milk may be depended upon to indicate the care it has previously had.

5. A large part of the milk analyzed shows it to have had proper care.

6. Cooling milk does not entirely prevent growth of bacteria, but prevents souring.

7. The cans of the local dealers into which milk is put add a considerable number of bacteria to the milk.

8. That a bacterial examination of dairies is a valuable assistance in improving the condition of a milk supply.

THE CHAIRMAN.— Gentlemen, Mr. Keith's valuable paper is before you for discussion.

DR. SWARTS.— I don't think, Mr. Chairman, that I fully understood about Table 1. As I understand it, those ten results, the results from the ten dairies, were milk taken under the conditions of a hood placed over the udder.

MR. KEITH.— The results were obtained from common milk drawn with usual care only, that is, just as the milk was received in Boston.

DR. SWARTS.— Then, the latter part of your paper, I was led to believe that you would have us infer that that contamination, such as there was, say, in dairies 1 and 3 there, came from the impure water in the cans. What I want to get at is whether it was the water which caused that or whether it was the detritus falling from the udder or the dirtiness of the hands of the attendants, or where that contamination came in dairies 1 and 3; and if in dairies 2 and 5, we will say, the sanitary conditions of the stable and the grooming of the animals, if any such grooming took place, were present there and absent in the other. What I should like to get at is what was

the cause of the contamination in 1 and 3, according to your opinion. And another thing I should like to ask, in the detail, the technique of it, is whether these individual numbers represent an individual plating or an average of a number of platings from one sample. Another question is as to what method you took to dilute your milk in order to get these counts,— that is to say, in one plate it would be difficult to count the two million in number,— what method or procedure you went under to get them down so that you could count them.

MR. KEITH.— These results in Table 1 were gotten from the milk as it was received in Boston from the dairies. In dairy No. 1, for instance, the five results might have been derived from milks received from that dairy at intervals of a day or so. In no instance, except in Table 2, has the milk been analyzed except on milks received from that same dairy on different days. The large number of bacteria found in dairy No. 1 was due, I think, entirely to the unsanitary conditions of the animals, stable, and care of the milk. The milk was not properly cooled, the animals were dirty, and, as we should say, the milk had not received proper care. In dairy No. 3, while the animals were perfectly clean, the infection evidently came entirely from that well water with which the cans were rinsed before putting the milk into them. The milk, of course, being warm, was especially favorable to the growth of these bacteria. Of course, the milk itself was a good culture medium into the bargain. So that the numbers in this case can be easily accounted for in this way. Dairies 2, 4, and 5 were model dairies in every respect,— clean men, clean animals, clean barns, and clean tie-ups.

DR. SWARTS.— What was the method of counts?

MR. KEITH.— The method that I employed for determining the number of bacteria is one that is ordinarily employed by bacteriologists,— a method of dilution, by diluting samples either one to one thousand or one to ten thousand with sterilized water and planting 1 cc. of the mixture, then multiplying my results by the amount of dilution. In other words, it is entirely impossible to count 24,000,000 bacteria in a single plate; but we can count 500; and, by diluting the milk sufficiently in a known ratio with sterile water, we can finally get them so low that we can count the colonies, when plated, and so find the number in the original milk.

DR. SWARTS.— In your dilution one to a thousand, was it done by shaking in a flask? and, if so, how long?

MR. KEITH.— It was done by shaking in a flask, by transferring 1 cc. of milk to 1,000 cc. of sterilized water, and then shaking thoroughly enough to get perfect mixture.

DR. SWARTS.— That would take how long?

MR. KEITH.— Only a few moments.

DR. SWARTS.— And, then, are these numbers the average of a number of plates or the individual plates?

MR. KEITH.— These are the individual plates. But, as I have said before, we have good reason to suppose that one examination of the milk gives a very fair idea of it, because on different days my numbers are not decidedly different with any one dairy in question. Of course, in some instances, they are different; but a farmer that is inclined to be dirty does not change his methods from one day to the other, and be clean one day and dirty the next. That is the point that I wished to bring out.

DR. GAGE.— Mr. Chairman, I have been listening to this paper with a great deal of interest, and thinking of the practical value it is to the milkman; but my mind goes back to the subject which I spoke of before this Association down the harbor some time ago, when the same subject was under discussion, and that is the fact that the doctor is chiefly interested in the pathogenic diphtheria that we get in the milk. I have recently seen some statistics from Europe, covering some cities in England and some cities, I think, in Norway and Sweden, where bacteriologists have reported that, in the samples of milk brought to the station by the cars to be delivered to that city, they have found from 15 to 24 per cent. of the samples to have the tubercle bacillus present. The veterinarians in my town or my city tell me that, so far as they can judge from their experience in the various farms or dairies about the city, anywhere from 25 to 50 per cent. of the cows are tuberculous. Dr. Ernst's experiments some years ago as to the percentage of tuberculous cows furnishing those bacilli in the milk, and these recent investigations as to the percentage in which the bacilli appear in milk delivered to large cities, it seems to me, make this question of exceeding importance; and I must say that, while I am

very anxious to get rid of the souring germ and the germs that cause putrefactive changes in milk, I am much more anxious to be sure that the tubercle bacillus can be kept out of the milk. I merely speak of this to bring it forward again. It seems to me it is a most fruitful source of investigation because of the dire results that come from drinking these pathogenic bacteria; and I should be very glad to know from the bacteriologists present if they can give us any new light as to the danger from the tubercle bacillus in milk, if any new investigations have been made locally, if it is not too far foreign to the subject.

THE CHAIRMAN.— Dr. Theobald Smith present?

Dr. Smith had left the dining-room.

DR. SWARTS.— As to the question of the pathogenic bacteria, I think there is no question; but in the paper it is brought out that those bacteria, when they enter the intestine of the infant, become pathogenic bacteria, producing intestinal disturbance, and are of more importance to us, perhaps, than the tubercle bacillus, inasmuch as the number of children who die of diarrhœal diseases from dirty milk is a much greater proportion than those from tuberculosis, although I would not question the desirability of hunting for the tubercle bacillus if it could be easily found.

THE CHAIRMAN.— Anything further to be said upon this paper?

DR. HILL.— I might say, in reply to Dr. Gage, that I am very sorry that Dr. Smith is absent, because he has been working on that very problem. It seems to be a little uncertain at the present time just how much of tuberculosis in the human is really produced by bovine tuberculosis. Dr. Smith has had some articles on that subject in the last year or two. I am sorry to say that my memory has given out on the details; but, in general, it seems that the danger from tubercular cows is not as high as was formerly estimated. I think that is the general trend of Dr. Smith's work.

DR. CHASE.— Mr. President, one of the gentlemen mentioned to the meeting just now a report of Dr. Ernst on an examination of the throat of a cow that died with some mysterious symptoms; and I

will read this to the Association, with your permission. It is addressed to Dr. Winchester: —

HARVARD UNIVERSITY, MEDICAL SCHOOL.
BACTERIOLOGICAL LABORATORY, BOYLSTON AND EXETER STREETS,
BOSTON, March 29, 1894.

Dear Doctor,— We have found, in section of the material from the trachea of that cow, bacilli that in size and general appearance resemble very closely, if they are not identical with, the Klebs-Loeffler bacillus.

Dr. Whitney wants to know if you are going to be able to send that specimen for the museum.

Very sincerely,

HAROLD C. ERNST.

That, of course, is suggestive of another source of infection for that milk in Brookline; but I understand that the view now held by veterinarians is that cattle do not have the same form of diphtheria that human beings have. There is no bacillus in the disease resembling diphtheria found among calves, but a bacterium.

THE CHAIRMAN.— Is there anything further to be said upon this paper? I take this occasion to say that one of the papers submitted for the prize is not accompanied by the sealed envelope containing the writer's card. I don't know who the writer is, of course; but, if he should be here or should hear of this fact, he might send his card in sealed envelope,— send it to me if he will. Otherwise, when this question is determined, we might be unable to give the writer's name.

Are there any further remarks to be made? If not, a motion to adjourn would be in order.

On motion the Association voted to adjourn.

PUBLISHERS' DEPARTMENT AND BOOK NOTES.

In this department the publishers will include notices of such subjects, germane to the scope of the *Journal*, which would seem to be of interest to its readers, but which are not a part of the transactions of the Association.

A NEW IMPROVEMENT IN BURIAL CASKETS.

The problem of the manufacture of a burial casket which should be absolutely air-tight and fluid-proof has for a long time been the subject of much thought and not a little practical experiment. Such articles have been advertised heretofore, but probably every member of a Board of Health knows that there has been thus far no such casket readily obtainable which he could safely and completely indorse.

In the transportation of bodies over long distances and also in order that public funerals might be held over persons who have died of contagious disease, such an article is so essential that any progress in this direction cannot fail to interest the readers of this *Journal*. They will therefore be glad to learn that the problem now seems to be successfully solved, and that in a short time it may be possible to obtain a really air-tight and fluid-proof casket which Boards of Health can safely permit to be used under such circumstances.

These caskets which are being manufactured by the American Metal Casket Company are made from a special metal known as Leaded Sheet Steel, which, together with special machinery for their manufacture, has been invented by this company. These inventions were necessary, for never before has there been the need of stamping out with dies such large sheets of steel. The lead in the metal renders it malleable, and protects it from the action of fluids and from weathering, while its addition to the weight is trifling, the largest sized casket, completely fitted, weighing less than seventy-five pounds.

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They have already been shown to the officials of the War and Navy Departments, the Boston Board of Health, and the larger hospitals in this vicinity, and have met with unqualified approval; and the indications are that the support from these sources alone will tax the capacity of the plant for a long time. If the results prove as claimed, our readers can well believe this fact when they consider that the Boston City Hospital alone sends upward of four hundred bodies every year to the British Provinces alone. The members of this Association will soon have the opportunity of practical investigation, since, shortly after May 1, the company will have its representatives actively at work exhibiting the casket to the Boards of Health throughout the State.

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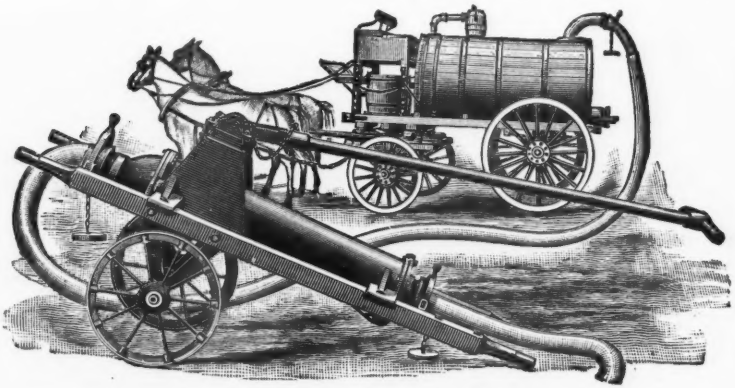
The Board of Health,

(Signed) S. H. DURGIN, Chairman.



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Secretary Board of Health, Brockton, Mass.

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